

DIVISION 15
SECTION 15600

**GENERAL PROVISIONS FOR REFRIGERATION PIPING &
SYSTEM INSTALLATION**

Tyson Foods, Inc.
Tyson Engineering

REVISION STATUS LOG

DATE	REVISION DESCRIPTION	ORIGINATOR	APPROVED ENGINEERING SERVICES	APPROVED CONSTRUCTION ENGINEERING PROJECT MGR

1.0 ~~1.0~~ GENERAL

1.1. SCOPE

- 1.1.1. The work covered by this section includes furnishing of all labor, material and equipment necessary to furnish and install Refrigeration Piping and Refrigeration Systems.
- 1.1.2. It will be the Contractor's responsibility to coordinate with all other trades for installation of the Refrigeration Piping and Refrigeration Systems in a timely fashion throughout the course of the project.
- 1.1.3. Location of equipment and routing of pipes, ductwork, insulation and roof penetrations shall be mutually agreed upon, subject to approval of Tyson Foods, Inc. Corporate Engineering Department, before field work commences. If the Contractor fails to comply with this requirement, he/she will be required to clear any resulting interferences in a manner satisfactory to Tyson Foods, Inc. Corporate Engineering Department without additional cost.
- 1.1.4. This Contractor shall include all weekend work, start-up activities and coordination efforts with Plant Operations as part of this project.
- 1.1.5. The work to be provided under this division of the specifications includes, but is not limited to, the furnishing and delivery of any Tyson Foods, Inc. purchased and/or non-purchased equipment, all unloading, handling, storing, protection, erecting, adjusting, testing and cleaning of all equipment, materials and apparatuses which are required for a complete system in all respects and fully adjusted and capable of operating ~~as shown on the drawings and/or in the specifications and/or Request for Bid.~~
 - 1.1.5.1. The Contractor under this division of the specifications shall furnish all labor, materials and equipment necessary to receive, unload, rig, remove shipping blocks, studs or welds and install all of the equipment pre-purchased or furnished by Tyson Foods, Inc. and shall connect all equipment as specified herein and shown on the drawings, and shall place the equipment in operation **in accordance with the requirements of the drawings and specifications.**
 - 1.1.5.2. Tyson Foods, Inc. furnished equipment will be delivered by Tyson Foods, Inc. to the job site where it shall be **inspected** by the Contractor and Tyson Foods, Inc. Project Engineer immediately upon its arrival.
 - 1.1.5.3. The Contractor shall be responsible for accepting the equipment and for its handling and delivery to the site of installation or storage. All costs incident to such handling, delivery and warehousing shall be borne by the Contractor.
 - 1.1.5.4. The Contractor shall be held responsible for all loss or damage to the Tyson Foods, Inc property while said property is in the Contractor's **custody.**
 - 1.1.5.5. Supplies, materials and equipment deposited by Tyson Foods, Inc with the Contractor for use in performance of the contract are not to be removed from the premises or custody of the Contractor except upon written instructions by Tyson Foods. The Contractor shall, without cost to Tyson Foods, Inc, replace ~~in kind~~, or at the option of Tyson Foods, Inc., shall pay to Tyson Foods the value of such property that is lost, destroyed or otherwise damaged so as to be unsuitable for further use. Failure to make such restitution after due notice will result in a deduction from any balance owed to the Contractor for the performance of the work performed under this contract.
- 1.1.6. Tyson Foods, Inc. is of the resolute mindset that the refrigeration work is fully covered within these documents and accompanying attachments and drawings. Therefore, No change orders will be given for miscellaneous components not listed but inherent and relevant to complete



the refrigeration installation. Only a defined and mutually agreed upon change in scope shall result in any change orders to the awarded value of this contract.

- 1.1.7. Refrigeration Contractor shall establish **work** for its individual subcontractors, and shall be responsible for their management and adherence to Tyson procedures and standards.
- 1.1.8. The work being performed is on site at a Tyson Foods, Inc. facility and must conform to all Tyson Foods, Inc. plant policies and procedures, and shall be performed in a manner and at times to prevent disruptions of Tyson's operations.
- 1.1.9. Alterations to existing and adjacent new work
 - 1.1.9.1. All removals, relocations or adjustments of all mechanical and electrical work including piping, and equipment for the alterations cannot be completely detailed on the drawings.
 - 1.1.9.2. Survey the site and include and comment on all changes when formulating work covered in bid.
- 1.1.10. The work specified herein shall also include the repair or replacement as may be necessary to the existing and adjacent new mechanical and electrical systems, wherever such systems are disturbed or otherwise damaged during the execution of all work as specified under this Contract.
- 1.1.11. Concrete Work
 - 1.1.11.1. Floor mounted equipment shall be located on concrete housekeeping pads.
 - 1.1.11.2. Concrete housekeeping pads shall be four inches thick and four inches wider than outside dimensions of **equipment**.
- 1.1.12. The Refrigeration Scope Of Work - Specifically includes the following:
 - **Definition Of Scope**
(Enter Scope Narrative or Task List in addition to the **following**)
 - ~~All un-insulated carbon steel piping shall be primed and painted.~~
 - ~~Surface preparation, paint and primer shall be selected and applied per manufacturer's specification. See attached paint specification sheets.~~
 - ~~All insulated carbon steel piping shall be cleaned of rust and coated with RG-2400 prior to insulating.~~
 - ~~Safety Relief Devices shall be designed according to ANSI/ASHRAE 15, Safety Code for Mechanical Refrigeration. Reference sections 9.4 through 9.8 and Appendix D.~~
 - ~~Relief piping shall be designed according to ANSI/ASHRAE 15, Safety Code for Mechanical Refrigeration. Reference Appendix E.~~
 - *Specifications (List)*
 - Scope Of Work And Equipment (Not Included)
 - *Specifications (List)*
 - Equipment Purchased By Tyson Foods, Inc.
 - *Specifications (List)*

- List Of Drawings

List Drawing Number, Sheet Number, Drawing Date

1.2. QUALITY ASSURANCE

- 1.2.1. The Refrigeration Contractor is required to field **verify all piping** and site conditions affecting this work.
 - 1.2.1.1. The Contractor shall verify actual conditions in the field, and shall take all necessary measurements for the proper installation of the work.
 - 1.2.1.2. Tyson Foods, Inc. shall provide detailed drawings and a comprehensive scope with which the Contractors will be able to supply a comprehensive stipulated lump sum bid.
- 1.2.2. Insulation has a marked affect on the integrity of the enclosure system over its lifespan, therefore Tyson Foods, Inc. will implement an inspection procedure.
 - 1.2.2.1. In each **zone** of insulation work, a section of insulation will be inspected by the Contractor and inspected by a Tyson Foods, Inc. Engineer for conformance to Tyson Foods, Inc. Insulation Practices. **Solely Tyson Engineering and the Tyson Foods, Inc. Project Engineer shall designate these inspection locations following installation of the areas.**
 - 1.2.2.2. The Contractor shall allow for time, material and labor associated with the inspection procedure in his/her bid price, for two inspections for each **sector** of insulation.
- 1.2.3. Quality Assurance measures ~~will be~~ taken by Tyson Foods, Inc.
 - 1.2.3.1. By submitting a bid on this refrigeration project, Contractor agrees to follow and meet Tyson Foods, Inc.'s specifications as documented for all areas of material, construction and installation as part of the bid package.
 - 1.2.3.2. Contractor shall correct any oversight or lack of conformance to Tyson Foods, Inc.'s material, construction and installation standards by Contractor at no cost to Tyson Foods, Inc.
 - 1.2.3.3.** Should the Tyson Foods, Inc. Project Engineer request a correction of work performed by the Refrigeration Contractor, the stage of progress of the work shall have no bearing on whether or not the Contractor shall repair or replace work not meeting the specifications and standards set forth.
- 1.2.4. Discrepancies and Requests for Information (RFI)
 - 1.2.4.1. Should any bidder or assigned Contractor find discrepancies in, or omissions from, the drawings or documents, or should requirements of governing authorities be found which affect the work as shown or specified, Tyson Foods, Inc. Project Engineer shall be notified in writing.
 - 1.2.4.2. If RFI is made during the bid process, the Tyson Foods, Inc. Project Engineer will then send written addendum instructions to all bidders, prior to awarding of the job.
 - 1.2.4.3. For post-bid Requests for Information (RFIs), Tyson Foods, Inc. Project Engineer shall furnish a change order for signature by both parties providing corrective instructions to the Contractor.

1.3. SUBMITTALS

- 1.3.1. Submit manufacturer's product data and specifications for fabrication and installation for all equipment and components that contractor is supplying, including data substantiating that products comply with requirements.
 - 1.3.1.1. Give full information as to dimensions, weight, materials, performance data covering the complete range of operating conditions, and all information pertinent to the adequacy of the equipment.
 - 1.3.1.2. Product data and samples shall comply with individual specification section requirements.
 - 1.3.1.3. Include six (6) copies for all data provided.
- 1.3.2. Shop Drawings
 - 1.3.2.1. Submit shop drawings to the Tyson Project Engineer for approval.
 - 1.3.2.2. The Contractor shall prepare any supplementary drawings ~~required~~ for clarifying details regarding shop fabrications or field installation and shall submit these electronically in Tyson's Drafting Department AutoCAD Standards and Formats to Tyson Foods, Inc. Project Engineer for acceptance. **Fabrication or installation shall not proceed without approved shop drawings.**
 - 1.3.2.3. Shop drawings shall comply with individual specification section requirements.
 - 1.3.2.4. No portion of the work requiring shop drawings, product data or sample approval shall be started until Corporate Engineering's approval is obtained in writing. Work done prior to receipt of approval shall be replaced as required at no additional cost to Tyson Foods, Inc.'s.
 - 1.3.2.5. Shop drawings for installation will not be required where Contract Documents suffice. However, where the Contractor's equipment differs from that shown on the Contract Drawings or where additional details are required, shop drawings shall be submitted.
 - 1.3.2.6. The Contractor shall use the manufacturer's certified shop drawings, approved by Tyson Foods, Inc, in ~~connection with this work~~
- 1.3.3. P & IDs
 - 1.3.3.1. The P&IDs ~~shall~~ be used to conform to the technical specifications and requirements.
 - 1.3.3.2. These drawings are provided to establish the minimum requirements needed and assist the Contractor with the cost estimate for the bid.
 - 1.3.3.3. This Contractor shall continuously mark a set of P&IDs and orthographic drawings with a red color pencil for changes or deviations from drawings. These drawings, once corrected by the Contractor in AutoCAD, shall be submitted to Tyson Foods, Inc.'s Project Engineer at the completion of the job showing **"as-built"** conditions.
- 1.3.4. Contractor shall deliver without cost to Tyson Foods, Inc., certifications of inspection and approvals as are **required**, and shall pay all charges and fees in connection with the work.
- 1.3.5. Copies of drawings bearing the stamp of approval of the authorities having jurisdiction shall be submitted to Tyson Foods, Inc. Project Engineer prior to starting the work.

1.3.6. Progress Schedule

- The Contractor shall inform Tyson of the progress schedules of all other subcontractors and shall work in accordance with the approved schedules for completion of this job.

1.3.7. Test Records and Instruction Manual

1.3.7.1. Submit test records on reproducible sheets to Tyson Foods, Inc. Corporate Engineering for approval and include copy in the Instruction Manual.

1.3.7.2. The format of the record sheet shall be approved by Tyson Foods, Inc. Corporate Engineering prior to actual testing of equipment.

1.3.7.3. Compile and submit to Tyson Foods, Inc. Corporate Engineering six (6) bound Instruction Manuals. Provide the Instruction Manuals with an index sheet listing the contents in alphabetical order together with reference pages, containing the material listed below:

- Operation instructions for each system including step-by-step preparation for starting, summer operation, winter operation, shut down, draining, etc...
- Manufacturer's literature describing each piece of equipment furnished or installed, giving the Unit No., System No., Manufacturer's Model No., and Drawing No.
- Wiring diagrams, as-installed and color coded, of electrical motor controller connections and interlock connections of all equipment listed in the Equipment Schedules.
- Maintenance instructions for each type of equipment.
- Possible breakdowns and repairs for each type of equipment.
- Manufacturer's mechanical equipment parts list of all functional components of the system furnished or installed control diagrams and wiring diagrams, giving Unit No., System, Manufacturer's Model No., and Manufacturer's Part No.
- Recommended spare parts list.
- List of nearest local suppliers of all equipment.
- All items listed above shall be available at least four (4) weeks prior to the completion date, which will determine the time of the final inspection and Tyson Foods, Inc.'s instruction period.

1.4. DELIVERY, STORAGE AND HANDLING

- Delivery of any Tyson Foods, Inc. purchased and/or non-purchased equipment, all unloading, handling, storing and protection of such equipment shall be provided by this contractor.

1.5. SAFETY

- This contractor is required to comply with Tyson Foods, Inc. Process Safety Management Standard Operating Procedures - Breaking of Ammonia Piping & Equipment.

1.6. CODES AND STANDARDS

1.6.1. All work and equipment provided under this contract shall be installed in strict accordance with all applicable local codes and regulations at the time of the conception of the project in the following hierarchy.

1.6.1.1. City ordinance adopted codes.

1.6.1.2. If city ordinances do not exist, then state codes will be followed, otherwise

1.6.1.3. The latest calendar version of the following codes will be applied

~~1.6.1.4. These codes and references shall include, but not be limited to, the following~~

- AMMONIA PIPING CODES

~~ASME B31.5 All ammonia refrigeration piping materials, fittings, components, installation, welding and testing shall conform to the ASME Code for Refrigeration Piping B31.5 and the ANSI/TIA-2 1984.~~

~~IIAR All IIAR Standards and Guidelines~~

~~AWS All materials and processes used for joining ammonia piping shall conform to American Welding Society codes and specifications.~~

~~ASNI/ASHRAE 15~~ 

~~ANSI/ASHRAE 15 For all SRV and relief header design~~

~~International Building Code (IBC) OR SBCCI Code~~

~~International Mechanical Code (IMC) OR Uniform Mechanical Code (UMC)~~

1.6.2. All work and equipment provided under this contract shall be installed in strict accordance with all health and safety codes, OSHA Regulation 1910.119 (Process Safety Management) and all safety rules imposed by the plant.

1.6.3. Factory Mutual recommendations governing or relating to any portion of this work are hereby incorporated into and made a part of this specification.

1.6.4. Tyson Foods, Inc.'s Insurance Underwriter's design review and recommendations are hereby incorporated into and made a part of this specification.

1.7. REQUIRED PERMITS AND LICENSES

1.7.1. Contractor shall obtain all required permits and licenses and shall arrange for inspection of the work by all authorities having jurisdiction over the work.

1.7.2. The Contractor and Subcontractors must be licensed as required by the Country, Province or State, County, City, Township, and/ or Borough, that the work is located.

1.7.2.1. The Contractor must assure that current contractor licensing is in place prior to submitting a bid, no exceptions.

1.7.2.2. Tyson Foods, Inc. reserves the right to terminate the Contractor and any Subcontractors not properly licensed, **and withhold payment**. The work may be finished by another contractor and other subcontractors as required, and Tyson Foods, Inc. shall incur no liability whatsoever to the offending Contractor or any of the offending Subcontractors.

1.7.2.3. Costs of termination and any fines incurred for improper or no contractor's license shall be borne by the offending Contractor and Subcontractors.

1.7.2.4. Fines incurred by Tyson due to improper or no contractor's license shall be borne and paid to Tyson by the offending Contractor or Subcontractors.

1.8. REFERENCES

- *OSHA Regulation 1910.119, Process Safety Management*
- ~~*Factory Mutual*~~
- ~~*American National Standards Institute (ANSI)*~~

1.9. GUARANTEE

1.9.1. The Contractor shall **guarantee** materials and equipment furnished for a period of one year from date of final acceptance of the system. Every component installed under the contract, except when indicated otherwise in other sections of the specifications, is included. The Contractor, to the complete satisfaction of Tyson Foods, Inc., shall remedy defects in materials and equipment furnished, which become apparent as a result of normal usage during this **guarantee** period, without cost to Tyson Foods, Inc.

1.9.2. The Contractor shall guarantee that all workmanship installed under this contract ~~shall be first class in every respect~~, shall conform to the **best practice for** such work and shall be guaranteed for a period of one year from date of final acceptance of the system. The Contractor, to the complete satisfaction of Tyson Foods, Inc., shall remedy defects in workmanship, which become apparent as a result of normal usage, without cost to Tyson Foods, Inc.

1.9.3. All materials, equipment, apparatus and methods of installation must meet with the approval of Tyson Foods, Inc. Corporate Engineering Department.

1.9.4. Full opportunity shall be given to Tyson Foods, Inc. to make inspections as they deem ~~may be desirable~~ during the construction period for all workmanship, materials and equipment furnished at the site.

1.10. BINDING DOCUMENTS AND DRAWINGS

1.10.1. All drawings are a part of the contract and the drawings and these specifications shall be considered as complementary so that anything shown upon the one, or described by the other, or fairly implied by either or both, shall be done and performed the same as if shown upon and described by both.

1.10.2. The drawings are intended to cover the **complete refrigeration system**. These drawings may not show complete or accurate details of the actual final layout in every respect and it is the responsibility of the Contractor to obtain this additional information as required.

1.11. DIMENSIONS

1.11.1. Contractors are to use only dimensions ~~listed~~ and are **prohibited** from calculating the length using a scalable rule under the assumption that the drawing they possess is printed to a scale. Using dimensions other than the listed dimensions will result in the correction of error at the Contractor's expense.

- 1.11.2. All dimensions listed in ~~these documents~~ shall be field verified before fabrication of any piping or component intended to fit in the space for which the dimension is listed. No change orders will be allowed for rework required due to a lack of field verification of necessary information.

1.12. SUBSTITUTIONS

- 1.12.1. Where “Approved Equal” is omitted for ~~the~~ item, product, material, system or equipment, provide exactly as specified. No substitution will be considered or approved.
- 1.12.2. Where “Approved Equal” is included for ~~an~~ item, product, material, system or equipment, substitution shall be allowed only if written approval by Tyson Foods, Inc.'s Project Engineer is obtained prior to award of contract.
- 1.12.3. Requests for ~~alternatives~~ must be submitted and approved in writing by the Tyson Foods, Inc Project Engineer or Manager of Engineering.

2.0 PRODUCTS

2.1. MANUFACTURERS

- All isolation valves shall be ~~manufactured~~ as specified in the project Scope of Work.
 - Contractor shall **not** submit an alternate ~~manufacturer~~.
- All control valves shall be ~~manufactured~~ as specified in the project Scope of Work.
 - Contractor shall **not** submit an alternate ~~manufacturer~~.
- All pipe support above the roof shall be of ~~hot~~ galvanized construction.
 - All pipe supports in the Production area shall be stainless steel.
- All gauges shall be stainless steel, manufactured as specified in the project Scope of Work., 4-1/2” dial, liquid filled, with pressure range **appropriate** for the application.
- All ammonia pumps shall be manufactured as specified in the project Scope of **Work** ~~and designed specially for ammonia refrigeration~~.
- All relief valve piping material will be the same as other **refrigeration pipes**.
- **Marking Services Incorporated (MSI)** manufactures the Tyson Foods, Inc. standard valve tags.
 - MSI can be reached at: Phone, (414) 973-1331, or Fax, (414) 973-1332.
- **Sherwin Williams** manufactures Tyson approved paint. See paint specification 09900.

2.2. Materials

- 2.2.1. All pipe support above the roof shall be of hot ~~dis~~ galvanized construction.
- 2.2.2. All pipe supports in the Production area shall be stainless steel.
- 2.2.3.** All relief valve piping material will be the same as other refrigeration pipes.

2.3. NAMEPLATES

2.3.1. All equipment shall be provided with a permanently attached nameplate.

- Nameplate shall be made of corrosion-resistant metal with engraved letters that identify each unit of equipment.
- Plates shall be not less than 3 inches x 5 inches.
- Plates shall bear information pertaining to the units as follows:
 - Manufacturer's name and address
 - Serial and model numbers
 - Rated capacity
 - Temperature, pressure or other limitations

2.3.2. Each unit of equipment shall be identified by a 2-1/2 inch x 4 inch black surface white core plastic laminate nameplate with 3/8 inch engraved lettering bearing the equipment's system and mark number as indicated on Equipment P&ID Drawings.

2.3.3. Nameplates shall be permanently attached and installed clear of obstructions and insulation in a readily visible location to allow identification. Nameplates shall be projected within 6" of equipment to allow insulation clearances as necessary.

2.4. VALVE TAGS

2.4.1. ~~Valve tags shall be provided for all valves.~~

2.4.1.1. Tags shall be made of 20-gauge stainless steel or Lexan material (thickness based on choice of tag), 2-inch round or 2-inch square.

2.4.1.2. The service designation shall be a minimum 1/4 inch high letters placed horizontally.

2.4.2. The Tyson Foods, Inc. Plant Engineer and Project Engineer shall select one or more of the following valve tag options:

- Two inch (2") round stainless steel laser-engraved with black lettering. The Tyson Foods, Inc. part number for this option is LB501001.
- Two inch (2") square MAX-TEK™ rigid lexan with yellow background and black lettering on one side. The Tyson Foods, Inc. part number for this option is LB501002.
- Two inch (2") square MAX-TEK™ flexible lexan with yellow background and black lettering on both sides. The Tyson Foods, Inc. part number for this option is LB501003.

2.4.3. Tyson Foods, Inc. Quality Control requires use of stainless steel tags in production areas or where there is open product. Any tag option may be used in other locations.

2.4.4. Information on the tags shall contain either three or four lines of text depending on the Plant standard configurations.

~~2.4.5. The standard valve tag shall display three lines of numbers and text with the option to have a fourth line that corresponds to the Tyson Foods, Inc. P & ID number. This shall be in accordance to the following schedule:~~

- ~~• Line 1 (Top): Service designation.~~
- ~~• Line 2 (Middle): Normal, or natural position of the valve, i.e., in the case of a solenoid valve; “N.O.” or “N.C.”.~~
- ~~• Line 3 (Bottom): Valve number.~~
- ~~• Option, line 4 (Bottom): The Tyson Foods, Inc. P & ID number.~~

~~2.4.6. Options for Valve Tag Fasteners~~

- ~~• 1/16” stainless steel rope, with stainless steel compression sleeves~~
- ~~• Stainless steel meter seals from Marking Services Incorporated (MSI)~~
- ~~• Stainless steel jack chain from Marking Services Incorporated (MSI)~~

2.5. ANCHOR BOLTS

2.5.1. Provide anchor bolts for all equipment resting on concrete.

2.5.2. The Contractor shall obtain anchor bolts in advance of equipment, early enough to be secured in place prior to the concrete being poured.

2.6. PAINTING OF AMMONIA PIPING

All insulated piping shall be cleaned of rust according to piping prep protocols prior to insulating.

2.6.1. All non-insulated pipes shall be covered with one coat of primer (Sherwin Williams Corothane I MIO Aluminum, B65S14, at 2.0 – 3.0 mils DFT) and two coats of paint (Sherwin Williams Hi-Solids Polyurethane, B65-300 Series, at 2.0 – 4.0 mils DFT)

2.6.2. Ammonia piping shall be ANSI safety orange.

2.6.3. Insulated pipe- Normal application temperature (outside ambient temperature), 50° F and above:

2.6.3.1. Surface preparation shall be as a minimum SSPC-SP 6. Abrasives used for blast cleaning shall be garnet or aluminum oxide appropriately sized to produce a 2.0mil median surface profile.

2.6.3.2. Surface preparation for small parts and at field welds shall be as a minimum SSPC - SP11 with power tools cleaning to bare metal.

2.6.3.3. The Coating system shall be one or two coats of Sherwin Williams Epo-Phen, Part A B62A55 and Part B B62V55, at 7.0 to 9.0 mils DFT total.

2.6.4. Insulated pipe- Low application temperature (outside ambient temperature), 20° F to 50° F:

2.6.4.1. Surface preparation shall be as a minimum SSPC-SP 6 Abrasives used for blast cleaning shall be garnet or aluminum oxide appropriately sized to produce a 2.0mil median surface profile

- 2.6.5. Un-insulated Pipe- Normal application temperature (outside ambient temperature), 20° F and above:
 - 2.6.5.1. Surface preparation shall be as a minimum SSPC-SP -6.
 - 2.6.5.2. Paint manufacturer's recommended surface preparation may be SSPC-SP 6 or SSPC-SP 11. Abrasives used for blast cleaning shall be garnet or aluminum oxide appropriately sized to produce a 2.0mil median surface profile
 - 2.6.5.3. The Coating system shall be one coat of Sherwin Williams Corothane I MIO Aluminum B65S14 at 2.0 to 3.0 mils DFT primer, and two coats of Sherwin Williams paint Hi – Solids Polyurethane Gloss, B65 Series, at 2.0 to 4.0 mils DFT.
 - 2.6.5.4. The total DFT shall be 4.0 to 6.0 mils for both coats.

3.0 EXECUTION

3.1. TESTING

- 3.1.1. Contractor shall perform tests on individual equipment, systems and their controls as described in the specifications and on control description in the presence of the representatives of Tyson Foods, Inc. and such other parties as may have legal jurisdiction.
 - 3.1.1.1. In no case shall any piping, fixtures, equipment or appliances be subjected to pressures exceeding their rating.
 - 3.1.1.2. Supply all labor, materials, instruments, power, etc., required for testing.
 - 3.1.1.3. The duration of tests shall be as determined by the authorities having jurisdiction, but in no case less than the time prescribed in the specifications.
 - 3.1.1.4. Equipment shall be tested under field conditions to demonstrate capability to meet specification requirements.
- 3.1.2. Equipment and system which normally operate during certain seasons, shall be tested during appropriate season.
- 3.1.3. Where the equipment or system under test is interrelated with and depends upon other equipment, systems and controls for proper operation, functioning and performance, the latter shall be operated simultaneously with the equipment or system during tests to ensure appropriate functionality.
- 3.1.4. Promptly repair or replace all defective work and repeat the tests until the particular system and components thereof receives the proper acceptance.
- 3.1.5. All damage resulting from tests shall be repaired and damaged materials replaced, all to the satisfaction of Tyson Foods, Inc. at no additional cost.

3.2. MAINTENANCE OF EQUIPMENT

- 3.2.1. Take necessary measures to ensure adequate protection of all equipment and materials during delivery, storage, installation and shutdown conditions. This responsibility shall include provisions required to meet the conditions incidental to the delays pending final test of systems and equipment under seasonal conditions.

3.2.2. Operate the completed systems for a period of time prescribed by Tyson Foods, Inc. Project Engineer to determine the capability of the equipment and controls to conform to the requirements of the drawings and specifications.

3.2.3. Maintain all equipment and systems installed until final acceptance by Tyson Foods, Inc. Corporate Engineering.

3.3. INSTRUCTION

- ~~The manufacturers of all major components of the system will provide factory startup and training personnel as required for all equipment purchased directly by Tyson Foods, Inc.~~ The Contractor shall provide the services of a service technician to demonstrate and instruct plant operating personnel in the use of all components and systems provided by the Contractor.

3.4. PROVISIONS FOR LATER INSTALLATION

3.4.1. In general, cutting through floors, walls and partitions shall be avoided and will be permitted only where absolutely necessary.

3.4.2. Structural members shall not be cut except upon approval by Tyson Foods, Inc.'s Project Engineer.

3.4.3. Where any work cannot be installed as the construction is progressing, provide for boxes, sleeves, inserts, fixtures or devices as necessary to permit installation of the omitted work during later phases of construction.

3.4.4. Arrange for chases, holes and other openings in masonry, concrete or other work and provide for subsequent closure of any openings required for placing equipment.

3.4.5. Where cutting, drilling and patching of completed construction and finished surfaces are required, patch to match the undisturbed construction and finish.

3.5. PROTECTION OF ROOFING MEMBRANE

3.5.1. Refrigeration contractor is responsible for any damage to the roof membrane, flashings and insulation. The following are responsibilities of the Contractor and guidelines for protecting the roofing system:

3.5.1.1. Roof traffic must be kept to a minimum, using walkway systems when available and when not, by taking the most direct, safe route possible.

3.5.1.2. Frequent foot or cart traffic will require the Contractor to install a temporary plywood walkway using minimum 3/8" exterior grade plywood.

3.5.1.3. If it is necessary to move equipment or materials across the roof surface, carts with wide balloon tires must be used. Hard rubber or steel wheeled carts are not acceptable.

3.5.2. As much as possible, all fabrication and staging shall be completed on the ground. When fabricating or staging must take place on the roof, 3/8" minimum exterior grade plywood shall be adhered to a 1" minimum, moisture resistant insulation board to protect the roof. This protection must extend well beyond the staging or fabricating area.

3.5.3. When welding, protective blankets must be laid over the protection boards. Care must be taken to prevent the protection layer from being dislodged by wind. If the protection will be in place for an **extended time**, it is suggested that the plywood is strapped together with metal and secured with screws. Ensure that the screws do not penetrate the bottom of the plywood.

- 3.5.4. The roof shall not be used for storage of materials or debris the project generates. Material shall be brought up to the roof as it is required and debris removed from the roof daily. Debris and equipment shall not be laid on the roof directly, rather on a protective board of minimum 3/8" exterior grade plywood.
 - 3.5.5. Upon completion of a project, Contractors working on the roof are required, at their expense, to have the roofing subcontractor inspect and repair any damages to the roofing system as a result of their activity.
 - 3.5.5.1. A copy of the roofing contractor's inspection/ repair report shall be provided to the Project Engineer.
 - 3.5.5.2. If the Contractor damages the roofing system to the point of allowing water entry, the Contractor shall immediately contact the roofing subcontractor for permanent repairs.
- 3.6. CLEANING
- Contractor shall thoroughly remove all debris from the site daily, clean all apparatus before placing it in operation, restore finished surfaces if damaged, and deliver the entire installation in an approved condition.

DOCUMENT STANDARD REVISIONS

Rev.#	Description of Change	Approved By	Changed By	Date
0		Tyson Engineering	Mike Chapman	06/29/13